

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
RESEARCH AND TECHNOLOGY RESUME

## TITLE

PLANETARY ASTRONOMY (NASW-4266)

## PERFORMING ORGANIZATION

Planetary Science Institute  
2030 East Speedway, Suite 201  
Tucson, Arizona 85719

## INVESTIGATOR'S NAME

Dr. Clark R. Chapman

DESCRIPTION (a. Brief statement on strategy of investigation; b. Progress and accomplishments of prior year; c. What will be accomplished this year, as well as how and why; and d. Summary bibliography)

a. Strategy: The above-referenced Planetary Astronomy contract supports five senior researchers at the Planetary Science Institute (Drs. Campins, Chapman, Davis, Hartmann, and Weidenschilling) with some involvement of other staff members. The goal is to use a variety of observational techniques and instruments to reduce, interpret, and synthesize groundbased astronomical data concerning the comets, asteroids, and other small bodies of the solar system in order to study the compositions, physical characteristics, population properties, and evolution of these bodies.

b. Accomplishments: This year's research has involved five distinct efforts. Chapman has studied asteroids, with emphasis on synthesizing groundbased databases to determine surface mineralogies and population characteristics; many new results on taxonomy, size-distributions, and asteroid family traits have been obtained. Weidenschilling, Davis, and Chapman have been analyzing their 5-year lightcurve database on large, rapidly-rotating asteroids (a collaborative paper with Drummond is in press), and are involved in observations to fill in gaps in ecliptic longitude coverage. Hartmann has studied asteroids, Trojans, and comets using colorimetric, photometric, and spectrophotometric techniques and has clarified relationships among the various classes of outer-solar-system bodies and some Earth-approachers. Davis and Campins are renewing our earlier efforts to detect and study vulcanoids (hypothesized small bodies interior to Mercury's orbit) using more sensitive daytime IR techniques. Campins has used detector arrays for IR photometry and dynamical analysis of images of comets to study cometary dust. Chapman, Campins and others have performed a variety of programmatic tasks, as well, including Chapman's past chairmanship of the Planetary Astronomy MDWG.

c. Anticipated Accomplishments: We will continue in the directions mentioned earlier, with emphasis on interpretation and synthesis to follow up on the Asteroids II Meeting. A variety of observations will continue at Mauna Kea, Kitt Peak, Mt. Lemmon and elsewhere. Among the objects or classes of objects to be observed are Comets Brorsen-Metcalf and Schwassmann-Wachmann 1, 2060 Chiron, other Trojans, Hildas, and rapid rotators, and (perhaps) vulcanoids. Programmatic activities will continue at a reduced level.

d. Summary Bibliography (attached)

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